basis the board fixes the taxable values of the property possessed and distributes this among the counties *pro rata* of the length of line contained. Under this new law the rate of taxation and the method of collecting the taxes do not differ from those of the ordinary taxes levied in the state. The innovation appears in the manner of appraising the property affected by the law, namely, the property of express, telegraph, and telephone companies. To this assessment the companies took exception, contending that the law provided a special method of taxing particular property, and was therefore unconstitutional. For the three years in question the state board increased the valuation of property assessed under this law from $289,862 to $4,249,702.

The cases were decided in favor of the state, Chief Justice Fuller delivering the opinion of the court. He did not deliver his opinion in writing, contenting himself with the oral announcement that the decision of the court below had been affirmed. The court was almost evenly divided in opinion upon the cases, the vote being five to four in favor of sustaining the decision of the lower court. Mr. Justice White delivered the dissenting opinion; he was supported by Mr. Justice Harlan, Mr. Justice Brown, and Mr. Justice Field.

The Chief Justice also delivered the decree of the court in the Indiana cases, which involved the extent of the taxing power of the state as applied to express and telegraph companies in Indiana. The cases involved the validity of the state law of 1893, which empowers the State Board of Tax Commissioners to assess taxation other than that of a local nature upon express, telephone, telegraph, palace-car, sleeping-car, dining-car, and fast-freight companies. As the questions involved were similar to those settled in the Ohio cases the law was upheld. GEORGE G. TUNELL.

GOLD AND SILVER IN TERMS OF COMMODITIES.

PRICE being a ratio between money and commodities, changes of price may result from causes affecting either money or commodities. But, for the time being, we may omit all consideration of changes arising from commodities (such as diminished cost of production); in that case the purchasing power of gold and silver in terms of commodities may be represented by lines based on figures obtained from the usual tables of prices. These may be obtained by the following formulæ :

$$\text{Gold in terms of goods} = \frac{100}{\text{Index No. of prices of goods}}.$$

$$\text{Silver in terms of goods} = \frac{\text{Index No. of price of silver}}{\text{Index No. of prices of goods}}.$$

In explanation of the first formula, it is seen that the values of gold and of commodities in tables of prices stand in the reciprocal ratio to each other. When goods are compared with gold as a standard, gold is assumed to remain unchanged, and fluctuations in the price ratio are treated as if they were assignable to commodities alone. *E converso*, assuming goods to be the constant, gold may be compared with goods as a standard by taking the reciprocal of the index number given in tables of prices.

As regards silver, the prices of both silver and goods have been given in terms of gold ; therefore silver and goods may be compared with each other from the data in tables of prices. Since two things have had their movements recorded relatively to a common measure, we can express the movement relatively to each other by the ratios between their quoted numbers. The ratio of the index numbers of silver to the index number of goods will provide a number indicating the movement of silver relatively to goods as a constant.

In this attempt Sauerbeck's prices have been used, not that they contain so many articles as those of Soetbeer or Faulkner, nor because his prices are mainly those of extractive products, but simply in order to bring the comparison beyond 1890 and 1891, when the other tables end. Applying the formulæ above to Sauerbeck's tables, the following figures are obtained, and are the basis for the accompanying chart :

Inasmuch as gold and silver have been, in fact, the standards in the past, this study enables us to see with unmistakable clearness that neither gold nor silver has preserved unchanged the purchasing power over goods which each possessed before the great discoveries of gold and silver (beginning about 1850). The effect of the extraordinary increase in the production of gold appears in a fall in its value relatively to goods by 1853; and it does not recover this loss until 1883 ; while gold dragged silver down with it, as is shown by the general depression of both lines from 1853 to 1886.

It is to be observed, moreover, that in the period from 1850 to 1873 (when harmonious relations existed between gold and silver at most European mints) the two metals did not preserve at all times

VALUE OF GOLD AND SILVER IN
TERMS OF COMMODITIES

Average of 1846–1850 = 100.
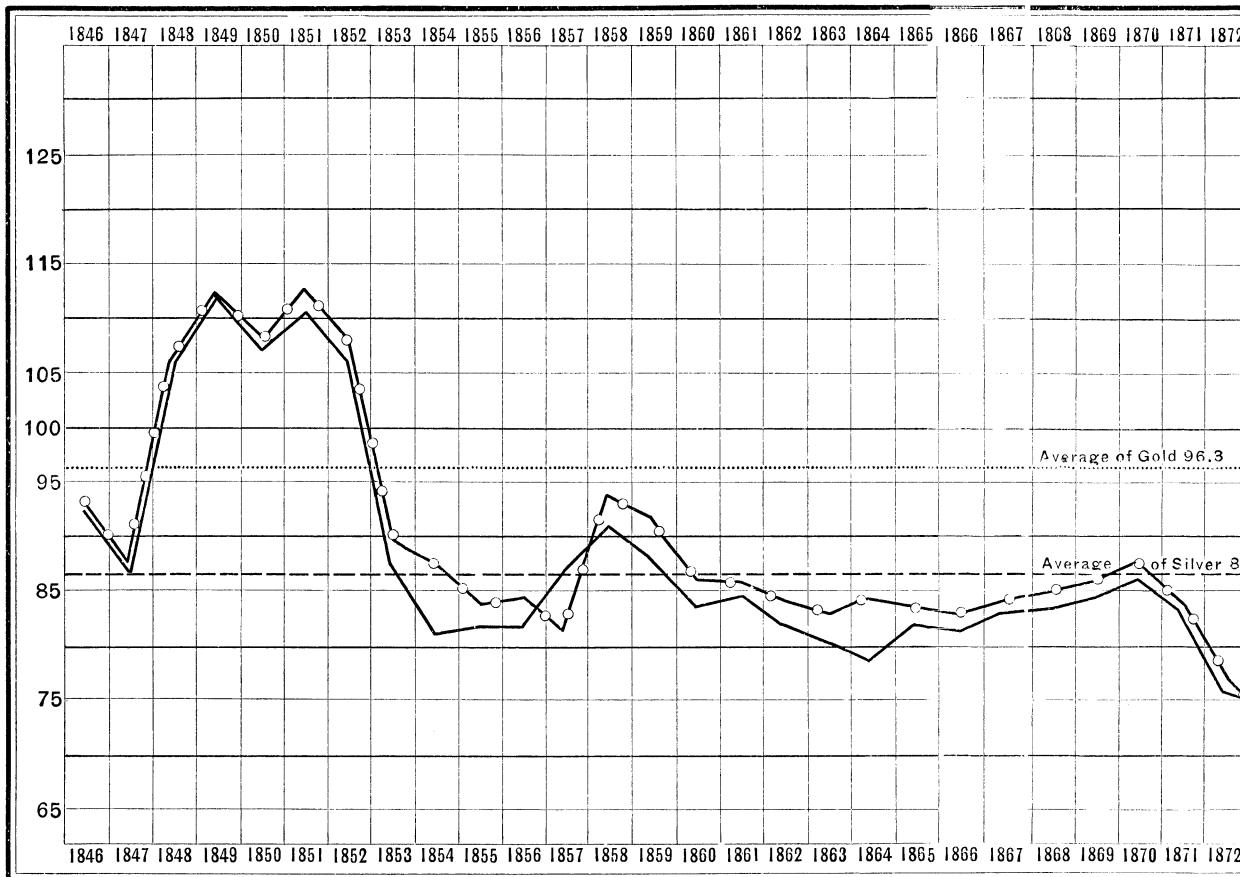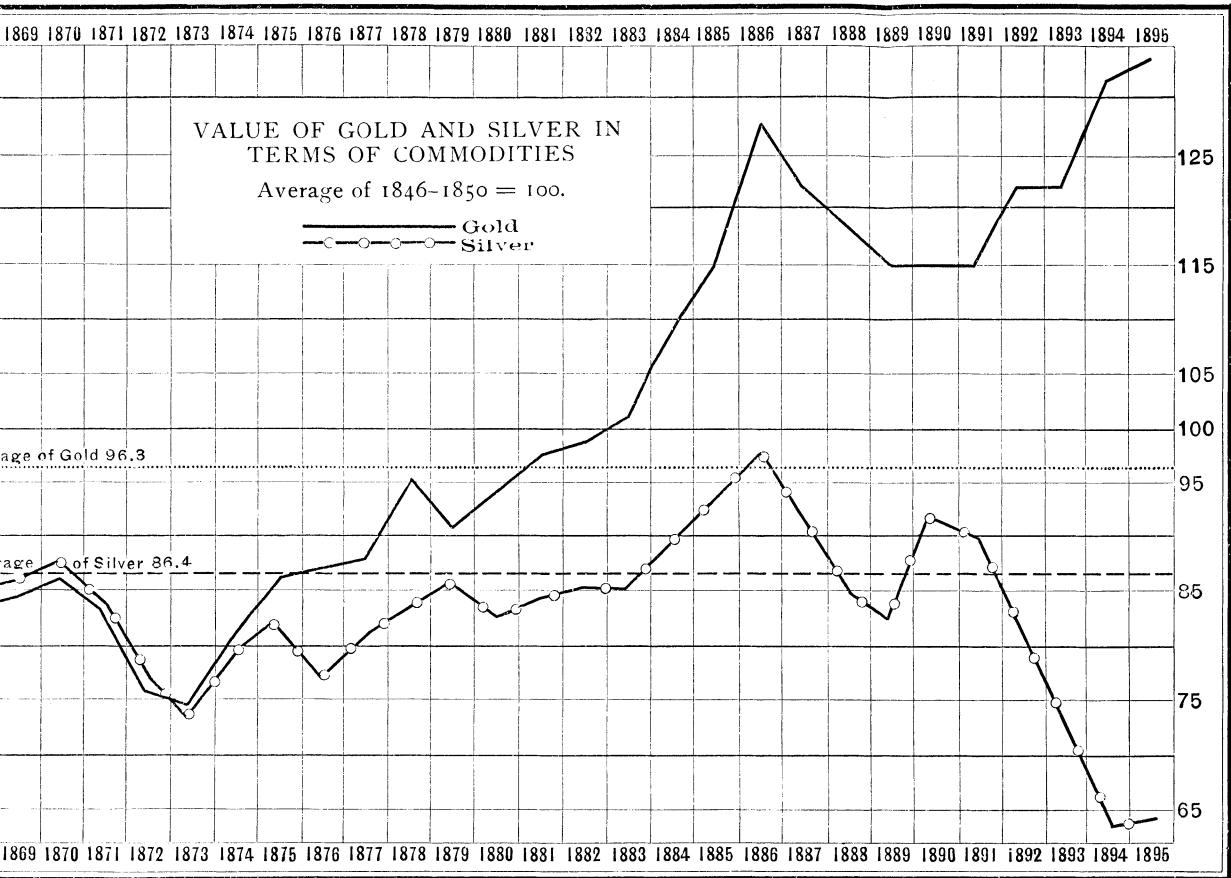
Gold
Silver

Year	Sauerbeck's index numbers for commodities in terms of gold		Index numbers for gold in terms of commodities reciprocal of index number	Sauerbeck's index numbers for silver		Index numbers for silver in terms of commodities reciprocal of index number
	100=average 1867–1877	100=average 1846–1850		15½ to 1 old ratio	100 being average of 1846–1850	
1846	89	107.7	92.8	97.5	99.4	92.2
1847	95	115	86.9	98.1	99.9	86.8
1848	78	94.4	105.9	97.8	99.7	105.6
1849	74	89.5	111.7	98.2	100.2	111.9
1850	77	93.2	107.2	98.7	100.7	108
1851	75	90.7	110.2	99.9	101.9	112.3
1852	78	94.4	105.9	99.9	101.9	107.7
1853	95	115	86.9	101.2	103.2	89.7
1854	102	123.4	81	101.1	103.1	87.6
1855	101	122.2	81.8	100.7	102.7	84
1856	101	122.2	81.8	101	103	84.2
1857	105	127.1	86.5	101.5	103.5	81.4
1858	91	110.1	90.8	101	103	93.5
1859	94	113.8	87.8	102	104	91.3
1860	99	119.8	83.4	101.4	103.4	86.1
1861	98	118.6	84.3	99.9	101.9	85.9
1862	101	122.3	81.7	100.9	102.9	84.1
1863	103	124.6	80.2	101.1	103.1	82.7
1864	105	127.1	78.6	100.9	102.9	84.1
1865	101	122.2	81.8	101.3	102.3	83.3
1866	102	123.4	81	100.5	102.5	83
1867	100	121	82.6	99.7	101.7	84
1868	99	119.8	83.4	99.6	101.6	84.6
1869	98	118.6	84.3	99.6	101.6	85.6
1870	96	116.2	86	99.6	101.6	87.5
1871	100	121	82.6	99.7	101.7	84
1872	109	131.9	75.8	99.2	101.2	76.7
1873	111	134.3	74.4	97.4	99.3	73.9
1874	102	123.4	81	95.8	97.7	79.1
1875	96	116.2	86	93.3	95.2	81.9
1876	95	115	86.9	86.7	88.4	76.8
1877	94	113.8	87.8	90.2	92	80.8
1878	81	105.3	94.1	86.4	88.1	83.6
1879	83	100.4	90.6	84.2	85.9	85.5
1880	88	106.5	93.8	85.9	87.8	82.4
1881	85	102.4	97.1	85	86.7	84.2
1882	84	101.6	98.4	84.9	86.6	85.2
1883	82	99.2	100.8	83.1	84.6	85.2
1884	76	92	108.6	83.3	85	89
1885	72	87.1	114.8	79.9	81.5	93.5
1886	64	78.4	127.5	74.6	76.1	97.1
1887	68	82.3	121.5	73.3	74.7	90.7
1888	70	84.7	118	70.4	71.8	84.7
1889	72	87.1	114.8	70.2	71.6	82.2
1890	72	87.1	114.8	78.4	80	91.8
1891	72	87.1	114.8	74.1	75.6	89.8
1892	68	82.3	121.5	65.4	66.7	81
1893	68	82.3	121.5	58.6	59.7	72.5
1894	63	76.2	131.2	47.6	48.5	63.6
1895	62	75	133.3	47	47.9	63.8

equality of purchasing power over goods; from 1857 to 1873 silver could buy more goods than gold.

A more detailed examination reveals the following facts relative to the stability of the two metals over long periods. From 1846 to 1895 gold has increased its purchasing power 42.5 per cent., while the purchasing power of silver is less by 51.9 per cent. From 1846 to 1891, when the great fall in the value of silver began, the purchasing power of gold increased 23.7 per cent., while that of silver decreased 2.7 per cent. From 1873 to 1891 gold increased its power over commodities 54.3 per cent., and silver also rose in value 21.5 per cent. Taking the period 1873 to 1895 gold rose 79.1 per cent., while silver fell in purchasing power 13.7 per cent. Taking the entire period of fifty years, gold more nearly than silver possessed the same purchasing power in 1895 which it had in 1846. Since 1873, however, the advantage lies with silver. A more important inquiry concerns the relative fluctuations from year to year. The fluctuations should be measured for gold and silver from their respective mean lines obtained by taking the averages of the entire list of index numbers for each metal, which are represented on the chart by the heavy dotted lines. It will be seen that, on the whole, after the first great fall, silver has been less variable than gold over the whole period. The sum of the fluctuations in the line of gold equals 349.5, those in the line of silver 170.8.

After 1873, when looked at from the point of view of this study, we find both gold and silver showing marked divergences of purchasing power. Both metals have proved erratic in comparison with goods as a constant. Warning should here be given, however, as to false inferences from this chart, owing to the selection of goods as a constant, when, in truth, they do change in conditions of production. Hence a rise in the purchasing power of gold or silver may be due in reality to a fall in the cost of goods. But the chart shows us fully what in fact was the relation of gold and silver to goods, irrespective of the forces producing the resultant in these years. An unexpected sequence is the undeniable fact that from 1873 to 1886 silver gained very materially in purchasing power over goods; that is, it rose from about 74 to 97, or over 30 per cent., in these thirteen years following the action of Germany. This is unmistakable, wholly apart from the causes that produced it.

Gold rose in its purchasing power over goods more than silver from 1873 to 1886; then fell; and in 1895 was about the same dis-

tance from the line of its departure in 1850 that silver was, except that gold was above and silver was below the line. Especially since 1873 have the facts shown that neither gold nor silver has proved a perfect standard of payments, if perfection be reckoned in unchanging purchasing power over goods.

These facts raise the fundamental questions as to the qualities obtainable in a standard. If the goods are not constant, but falling in value (while gold may be greatly increased in quantity by new discoveries), then it only proves that goods may have fallen farther than gold, giving the appearance that gold has risen, when both gold and goods had fallen relatively to some common standard. And if goods have fallen relatively to gold, and yet if silver has fallen still more it may seem as if goods had risen relatively to silver. These results take this character because all these figures are relative, and not absolute; since price is a ratio between the money commodity and all other commodities. And since there is no one commodity unaffected by changes in its cost and supply there never can be found any satisfactory standard in any one article. Certainly neither gold nor silver has been found satisfactory. As between the two, however, if stability of purchasing power be the criterion, during the past fifty years silver, more nearly than gold, has satisfied the requirements of a perfect standard.

The tables given above make it possible to find the value of a debt for any date expressed in commodities. For example, a debt of $1000 contracted in gold in 1880 would be represented by 93.8 per cent.; in 1890 by 114.8. Likewise a debt of $1000 in silver would be expressed by 82.4 per cent. in 1880, and by 91.8 in 1890. In other words, the gold debt expressed in terms of commodities has increased by 21 units, or 22.3 per cent.; the silver debt has increased by 9.4 units or 11.4 per cent. The problem of justice is to determine whether this unearned increment should go to the debtor or creditor, or should be divided between them.   E. S. MEADE.